

2000-2001 Annual Report



Innovative,
Technology-Based
Solutions to
Environmental
Challenges

Massachusetts Strategic
Envirotechnology Partnership

April 2001

Dear Citizens:

During its seventh year of operation, the Massachusetts Strategic Envirotechnology Partnership (STEP) has continued to successfully develop and promote innovative, technology-based solutions to environmental challenges across the Commonwealth. As a joint program between the University of Massachusetts (UMass) and the Executive Office of Environmental Affairs (EOEA), STEP is stimulating private development and investment in environmental technologies and creating a business and regulatory climate that encourages their commercialization.

In 2000 alone, 125 companies received some form of business, technical, or regulatory assistance from STEP. EOEA and UMass have collaborated through STEP to help early-stage environmental firms make their ideas a reality and to assist mature industrial firms with improving their environmental performance. STEP continues to grow as a national model for how government, industry, and a public university can work together to achieve significant environmental and economic goals.

Consider some of STEP's accomplishments in 2000:

- *The University of Massachusetts system partnered with industry on more than 35 applied research and development projects during the year, assisting the participating companies with developing, testing, and using their technologies and techniques.*
- *For every dollar that the Massachusetts legislature appropriated to the STEP program in FY 2000, over four dollars have been leveraged in company contributions and outside financing, illustrating the program's value to the state's manufacturing businesses and startup companies.*
- *More than 150 UMass faculty and students participated in STEP projects, assisting UMass in meeting its educational mission.*
- *STEP's capital-raising events succeeded in introducing over 40 individual, institutional, and corporate investors to other investors and to the management of 25 promising early-stage and expansion-stage companies in Massachusetts.*
- *STEP-assisted environmental companies succeeded in raising more than \$9 million in outside funding.*

This report illustrates many of the individual projects represented by these achievements. By working together, we are successfully bringing environmental technology to Commonwealth communities, making products and processes safer, and easing the burdens of doing business in Massachusetts. We remain committed to expanding and improving STEP during the coming years and to using the program to help meet the Commonwealth's environmental and economic goals.

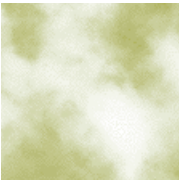
With regards,



William M. Bulger
President, University of Massachusetts



Bob Durand
Secretary, Executive Office of Environmental Affairs





MASSACHUSETTS STRATEGIC ENVIROTECHNOLOGY PARTNERSHIP

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STEP: A PARTNERSHIP THAT'S WORKING FOR YOU

Established in 1994, the Strategic Envirotechnology Partnership (STEP) is a joint program between the University of Massachusetts (UMass) and the Executive Office of Environmental Affairs (EOEA) to assist businesses with the development and promotion of innovative, technology-based solutions to environmental problems in the Commonwealth.

UMass and EOEA are working together to address the environmental needs of Massachusetts citizens through research, education, and public service. Through our multiple technology, business, and policy centers, the STEP partners work together to advance promising technologies and ventures through the many different stages of development, from an innovative idea to commercial use. By reducing the risk and uncertainty associated with bringing environmental technologies to market,

STEP's activities increase the amount of private investment in technologies that protect our environment.

In 2000, the STEP partners identified four areas of strongly shared priorities where they focus their resources:

- *Preventative, sustainable technologies*
- *Alternative/renewable energy technologies*
- *Assessment and monitoring technologies*
- *Technologies that convert waste and scrap into useful feedstock*

STEP'S MISSION

- *Promoting and stimulating private development and investment in environmental technologies*
- *Fostering a business and regulatory climate in which innovative environmental technologies can thrive*
- *Stimulating the development and use of specific technologies that further public mandates of increased environmental protection and resource conservation.*



THE STEP PARTNERS: A TEAM WITH RESULTS

STEP includes several agencies, centers, and institutes affiliated with the Executive Office of Environmental Affairs and the University of Massachusetts.

The *Executive Office of Environmental Affairs (EOEA)* is responsible for regularly reviewing its list of priority initiatives and determining opportunities for technology-based solutions to environmental problems. EOEA

ensures that STEP focuses on areas consistent with the state's environmental priorities. Within EOEA, the *Department of Environmental Protection (DEP)* evaluates state regulatory requirements to ensure consistent and fair regulatory treatment for innovative STEP-supported technologies and to facilitate permit reviews when appropriate. The *Office of Technical Assistance for Toxics Use Reduction*

(OTA) participates in assessing the merits of promising environmental technologies with an emphasis on manufacturing to help meet the state's pollution prevention and toxics use reduction challenges.

STEP is the largest collaborative program within the *University of Massachusetts (UMass)* system. The *President's Office* oversees STEP and ensures close cooperation with EOEA. In FY 2000, UMass received a total of \$2.5 million from the Massachusetts state legislature to support STEP activities at UMass campuses in Amherst, Boston, Dartmouth, and Lowell, and at their affiliated research centers. Over 150 students and faculty members throughout the UMass system participate in the STEP program each year.

The *Center for Energy Efficiency and Renewable Energy (CEERE)* at UMass Amherst supports STEP by providing technology assistance to companies with innovative environmental, renewable, and energy efficiency technologies. The *National Environmental Technology Institute (NETI)*, also at UMass Amherst, develops new

technologies and techniques to reduce waste and prevent pollution through research partnerships with government and industry.

At UMass Boston, the *Environmental Business and Technology Center (EBTC)* identifies and assesses companies that can use STEP services from one or more of the partners. EBTC then provides business development and capital-raising services to these environmental and energy companies. The *Advanced Technology & Manufacturing Center (ATMC)* at UMass Dartmouth brings together Massachusetts firms and UMass-Dartmouth faculty members to conduct applied research on new technologies that are both environmentally and economically sound. ATMC also conducts projects in applied research areas such as aquaculture, wastewater treatment, pollution detection, small sample preparation, renewable energy, and water information management.

The *Center for Environmentally Appropriate Materials (CEAM)* at UMass Lowell promotes the transfer of environmentally sound materials technology to firms that are seeking to reduce waste generation. CEAM also provides technical and policy advice on materials recycling, biodegradation, materials reuse, product design, and packaging selection. Also at UMass Lowell, the *Chelsea Center for Recycling and Economic Development (CCFRED)* helps create an infrastructure for a sustainable materials economy in Massachusetts by working with manufacturers, municipalities, economic developers, and other business service organizations.

STEP: IN ACTION IN 2000

BRINGING ENVIRONMENTAL TECHNOLOGY TO COMMONWEALTH COMMUNITIES

Each year, STEP works with companies to bring the benefits of environmental technology to Massachusetts communities. In 2000, we helped the private sector develop more environmentally sound ways to generate electricity; find, measure, and remove toxics from our environment; and generate local economic development opportunities.

Zero Mercury Challenge

STEP partners are working to achieve the zero mercury challenge. Mercury is a toxic chemical that can cause damage to the brain, nervous system, and kidneys. Mercury is found in many products, especially in the health care sector (e.g., thermometers).

Because of the damage it causes to human health and the environment, we must eliminate its use wherever possible and prevent its release into the environment.

In July 2000, the Executive Office of Environmental Affairs announced a goal of virtual elimination of the use and release of man-made mercury in Massachusetts. Although state agencies have been working independently to address mercury's environmental impacts over the last decade, the Zero Mercury Strategy is the first coordinated approach to the issue. The strategy includes three major components: reducing sources of mercury releases, outreach and education, and research and monitoring.

STEP has begun several efforts in support of the strategy. Last year, STEP published the results of an assessment of mercury removal technologies for wastewater from hospital waste streams. The project verified that three technologies could remove mercury to a concentration of 1 part per billion. The companies that own these technologies, ICET Inc. (Norwood),

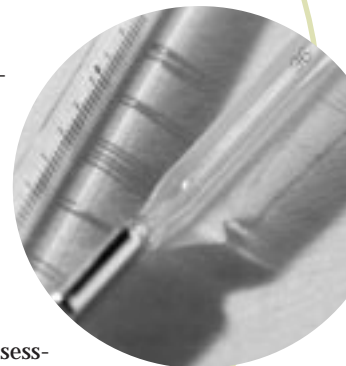
Prosys/Dubois (Billerica) and Aero-Terra Aqua (Cleveland), will use the results of the report to expand the use of these technologies as Massachusetts and other states reduce the amount of mercury allowed in wastewater.

In addition to this technology assessment, NETI funded research of a technology that helps monitor mercury in water and wastewater. For several years, STEP has also assisted SolmeteX, Inc. (Billerica), a company that specializes in removing toxic metals like mercury from commercial and industrial waste streams.

Harnessing Wind Power for the Commonwealth

STEP partners are helping Commonwealth communities more quickly and efficiently expand the use of wind power to generate electricity. For example, the Center for Energy Efficiency and Renewable Energy (CEERE) developed wind turbine specifications for the Hull Municipal Light Plant in Hull. Work undertaken included computer simulations, site assessment, and assistance with permitting and equipment evaluation. The wind turbine will replace a smaller existing turbine, installed nearly 20 years ago. The final dimensions of the new turbine could be as large as 750 kW, making it the largest turbine installed in the Commonwealth. A turbine of that size could produce approximately 1.6 million kW, enough power to serve over 100 homes.

CEERE's Renewable Energy Research Laboratory also completed a preliminary assessment of wind resources in Massachusetts' coastal waters. This work revealed that conditions are suitable for large-



STEP: IN ACTION IN 2000

BRINGING ENVIRONMENTAL TECHNOLOGY TO COMMONWEALTH COMMUNITIES

scale wind production in areas such as Nantucket Sound. Through a private/public partnership between the Division of Energy Resources, the Massachusetts Technology Corporation, CT Innovations, and Northeast Utilities, more than 250 wind turbines with a combined generating capacity of 500 MW could eventually be installed.



The center also developed recommendations for studies required for permitting, such as additional wind monitoring and noise impacts on marine mammals. Students and staff from CEERE installed remote monitoring equipment on the Bishop and Clerk's light off Yarmouth and will monitor the conditions over the next year. If developed, this would be world's

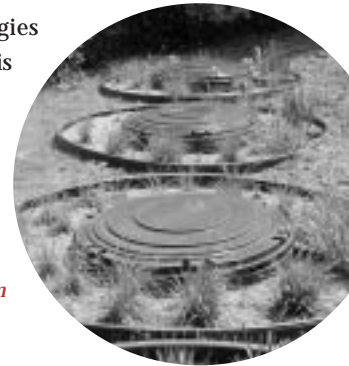
largest offshore wind farm and would confirm the use of wind power as a viable green power alternative for Massachusetts.

Evaluating Methods to Protect Water Quality

Management of storm water runoff is important to the health of the Commonwealth's watersheds and water quality, because rainwater washes pollutants from city streets and farms into our waterways. Storm water can also cause significant erosion. STEP, in collaboration with the Massachusetts Department of Environmental Protection and Massachusetts Coastal Zone Management, with funding from the U.S. Environmental Protection Agency, is evaluating proprietary storm water control technologies. CEERE has developed the testing and quality assurance protocols for these technologies and provided guidance on installation and management of the evaluation project. The results of these evaluations will be shared with multiple state agencies to accelerate the use of promising

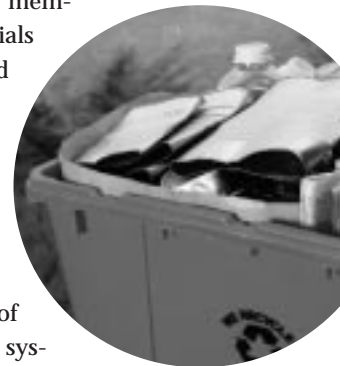
stormwater control technologies across the country. Massachusetts is a national leader in testing of these innovative, proprietary technologies to verify their ability to protect our watersheds.

StormTreat Units, which CEERE evaluated, protect the Ox Pasture Brook in Rowley, Massachusetts.



Helping Communities Develop Sustainable Business Strategies

Instead of landfilling valuable natural resources, the Chelsea Center for Recycling and Economic Development (CCFRED) has established a grant program to help communities explore how reuse and recycling of materials can be used to create economic development opportunities. In its first year, the Community Economic Development Through Recycling Program funded four projects. In Taunton and Adams/North Adams, community members evaluated the waste materials generated by area businesses and sought out existing companies that could use these materials in local manufacturing. The Asian Community Development Corporation used a grant to assess the organic waste generated in Boston's Chinatown, with the goal of setting up an in-vessel composting system at a local supermarket. Boston University used its grant to evaluate the potential of creating a medical equipment remanufacturing business in Boston's Chinatown and developed a business plan for a dental chair remanufacturing business.



STEP: IN ACTION IN 2000

BRINGING ENVIRONMENTAL TECHNOLOGY TO COMMONWEALTH COMMUNITIES

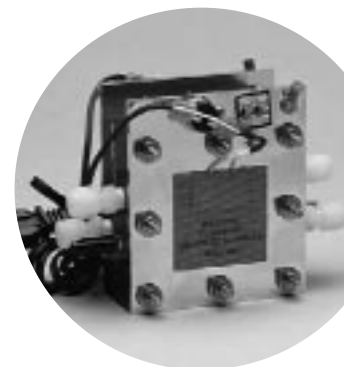
Creating a New Space Where Tech Companies Can Grow

To help Commonwealth industries find advanced technology and manufacturing solutions, while emphasizing community outreach and economic development, the Advanced Technology and Manufacturing Center (ATMC) will open a new 60,000

square-foot building at the Kerr Mill redevelopment site in Fall River in September 2001. By cooperating with the Massachusetts Development Finance Agency and the Fall River Redevelopment Authority, ATMC will offer space to Commonwealth industries for research and partnering, incubation of new companies, and conferences. The facility will also provide multi-tenant

space for technology companies that want to be close to UMass Dartmouth.

The new center will also provide core labs for prototyping, electronic systems development, material development test and evaluation, and software design and development. ATMC will maintain its interest in environmental technology in the new facility, but will also expand its work in the fields of acoustics, optics, telecommunications, and textiles.



STEP HELPS FIRM MAKE FUEL CELLS AVAILABLE

Deregulation of the power industry is creating a market in the hundreds of billions of dollars, most of which will be up for grabs as new technologies for generating power on site, such as fuel cells, are combined with sophisticated techniques to operate, control, and trade power. For over 12 years, ElectroChem, Inc. (Woburn) has successfully provided components, test equipment, and research supplies to the fuel cell industry around the world. With assistance from STEP, the company is ready to commercialize its Proton Exchange Membrane (PEM) fuel cell. ElectroChem hopes to seize a share of the market for smaller applications such as replacements for rechargeable batteries.

Through STEP, the UMASS Boston College of Management analyzed markets and the company's technical capabilities to produce the ECell, a 4 kW fuel cell for the interruptible power market now served by batteries, such as telecommunications towers. UMass Boston also assisted with the development of the business plan. Led by Professor John Duffy, the UMASS Lowell Mechanical Engineering Department helped ElectroChem develop a solar-powered electrolyzer to be combined with the fuel cell in one package. The company also participated in a capital-raising seminar, investor presentation training, and investor conference sponsored by UMASS Boston's Environmental Business and Technology Center. Now several major venture capital firms are interested in the company.

STEP: IN ACTION IN 2000

BRINGING ENVIRONMENTAL TECHNOLOGY TO COMMONWEALTH COMMUNITIES

Increasing Recycling of Food Waste

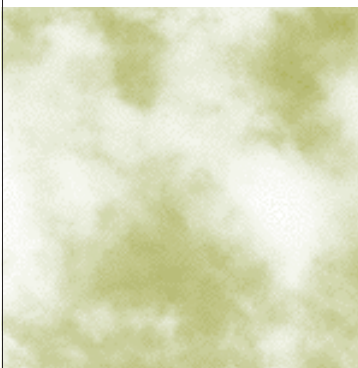
Increasing the recycling of food waste is an important component of the Commonwealth's plan to reduce the quantity and toxicity of its waste stream. DEP estimates that food waste makes up more than 10% of all municipal solid waste, and yet only 5 to 10% of it is being recycled. DEP's goal is to see the rate increase to 60%

by the year 2010. The key barrier to increased composting of food waste is the lack of processing capacity, which is compounded by difficulties in siting composting facilities.

The Environmental Business and Technology Center (EBTC) conducted a review of the autothermal thermophilic aerobic digestion technology proposed by Bio-

Dynamics LLC (West Concord), as a way to promote understanding of this innovative technology and to accelerate its appropriate use. STEP's technology

review included an analysis of the proposed manufacturing process, benefits and limitations of the technology, costs, and regulatory and safety requirements. DEP staff contributed regulatory information to the report and have worked with the company to issue the approvals needed for a proposed facility in Massachusetts.



STEP: IN ACTION IN 2000

MAKING PRODUCTS AND PROCESSES SAFER

*S*TEP partners work with scores of consumer product and manufacturing companies each year to make their products and processes more environmentally sustainable and safer for the people of the Commonwealth.

Getting the Lead out of Computer Electronics

European and Japanese markets are requiring the removal of lead from electronic products and several government bodies in the United States, including the Commonwealth, are banning computer monitors and televisions from landfills because they contain high volumes of lead.

Companies such as Hitachi, Panasonic, Sony, Delphi/Delco, and Honeywell are researching lead-free alternatives and several of these companies are working cooperatively with UMass Lowell on research projects. This collaboration is one of the first of its kind to publish the results of its efforts to find suitable replacements for lead.

Sponsored by the Center for Environmentally Appropriate Materials (CEAM) and working with several industry partners, including BTU International (North Billerica), Sanmina Corporation (Haverhill), Raytheon (Lexington), Solectron (Westborough), and Texas Instruments (Attleboro), the UMass Lowell research team demonstrated that tin-bismuth, tin-silver, and tin-silver-copper alloys are reasonable alternatives to lead solder. "We have demonstrated a reasonable testing program to address the industry's concerns-quality, reliability, cost, and manufacturability," says Sammy Shina, a professor of mechanical engineering at UMass Lowell.

"[The UMass Lowell project] is the most up-to-date lead-free project and was completed ahead of many other international efforts."

—Don Abbot of Texas Instruments

Reducing Air Pollution with Cleaner Burning Engines

Long-term exposure to nitrogen oxides (NOx) is associated with many lung ailments and diseases, including childhood asthma. When smog warnings are issued to alert those with breathing problems to limit activities, it is often because high concentrations of NOx have been measured in the air.

Using funding from the National Environmental Technology Institute (NETI) and with the corporate support of General Electric and United Technologies, Professor Phillip R. Westmoreland of the Department of Chemical Engineering at UMass Amherst has used computational molecular modeling to identify exactly where in the process noxious NOx is created in power plants and jet engines, which are significant sources of NOx pollution.

According to scientists at United Technologies Research Center, this expertise in computational quantum chemistry and Westmoreland's ability to theorize what is happening at far higher temperatures and pressures than can be created safely in a laboratory will allow the industry to make major strides in NOx reduction. United Technologies/Pratt & Whitney is using Westmoreland's tools to test new designs for clean-burning power turbines, especially for peak-demand electricity generation.

"This fundamental research [by STEP] is helping with the development of cleaner engines, at lower cost to the industry. And that should eventually translate to cheaper fares for the consumer."

*—Dr. Meredith Colket III,
United Technologies Research Center*



STEP: IN ACTION IN 2000

MAKING PRODUCTS AND PROCESSES SAFER

Reducing the Waste Produced in Metal Working

The electronics and metalworking and plating industries use acid baths to remove unwanted substances in their metal etching and stripping processes. When the concentration of the contaminants becomes too high, the spent bath must be disposed of, usually creating hazardous liquid and solid wastes.



Developing innovative technologies to recycle spent baths can significantly reduce the amount of waste created. CEAM Professors Francis J. Bonner and Alfred A. Donatelli investigated one such technology: diffusion dialysis through anion exchange membranes. The research team developed the information needed to improve commercial equipment

and procedures currently used to reclaim spent acid from metal treating operations using anion exchange membranes in the absence of external electric fields.

Leading the Way to Green Chemistry

When planning how to make a new chemical, environmental impacts are typically not considered. But several organizations, including STEP, are working to change that by demonstrating that “green chemistry” methods can produce the results industry needs without environmental degradation.

Massachusetts and STEP are fortunate to have an internationally recognized leader in green chemistry, Dr. John Warner at UMass Boston, along with faculty members throughout the UMass system and EOEAs Office of Technical Assistance who are actively collaborating with industry on a variety of green chemistry applications. These green chemists think about whether the materials they start with come from renewable resources; whether solvents designed to

dissolve compounds are easy to recycle; whether the processes waste chemicals; and whether any of the components—reactants, solvents, products and waste—are hazardous to human health, worker safety and the environment.

In recognition of his leadership, last year Dr. Warner received a \$100,000 grant from the UMass President's Office. Part of this grant was used to host a green chemistry forum on April 6, 2001. The First Annual Green Chemistry Conference in Massachusetts introduced green chemistry expertise and practice in Massachusetts, to 125 biotechnology, plastics, and resin manufacturing companies, university faculty and government officials. The forum showcased 20 green chemistry projects underway at UMass Amherst, Boston and Lowell with industry partners.



STEP: IN ACTION IN 2000

EASING THE BURDENS OF DOING BUSINESS

*A*s a result of STEP's work, the Commonwealth has emerged as a national leader in the commercialization of environmental and renewable energy technologies. STEP's wide range of assistance makes it easier for technology companies to succeed in Massachusetts.

Establishing the Relationships That Bring Products to Market

Successful commercialization of a product is often dependent on building strong relationships with investors and commercial partners. The Environmental Business and Technology Center (EBTC) expanded its assistance to Massachusetts technology companies that have received Small Business Innovation Research

(SBIR) grants from the U.S. Environmental Protection Agency and other federal agencies. Only one in four SBIR participants nationwide succeeds in commercializing their technologies within six years of receiving a SBIR Phase II grant to demonstrate a technology's commercial viability. To increase their likelihood of success, EBTC teamed with the EOE and the Massachusetts Technology Collaborative to provide Commercial Partnering Assistance (CPA) to SBIR Phase I grant recipients.

This assistance includes introducing SBIR firms to potential partners that could host demonstration projects, establish a joint venture with the grantee to further develop the technology, or license the process outright, greatly improving their chances of receiving a Phase II award (prototype development) and ultimately bringing the technology to market. For example, during STEP's CPA assistance to Aerodyne Research, Inc. (Billerica), both Keating Technologies, Inc., and Environmental Systems Products, Inc. agreed to participate as partners in Phase II of Aerodyne's work to

develop additional applications for quantum cascade lasers in automobile pollution measurements.

Of the four companies assisted through CPA in 2000, three companies—Aerodyne Research, Inc. (Billerica), CeraMem Corp. (Waltham), and E Paint Co. (East Falmouth)—received Phase II awards in 2000. New companies assisted in 2001 include Covalent Associates, Inc. (Woburn), Foster-Miller, Inc. (Waltham), Phoenix Science and Technology, Inc. (Lexington), and Radiation Monitoring Devices, Inc. (Watertown).

"STEP helped us develop a more compelling and focused commercialization pathway for our technology and significantly strengthened our proposals."

—Aerodyne President Charles Kolb

STEP HELPS RAISE CAPITAL FOR ENVIRONMENTAL TECHNOLOGY

To assist the growing number of Massachusetts companies seeking capital, EBTC offered a series of networking events in 2000, including the Environmental Capital Forum, Raising Capital Seminar, and the Investor Presentation Training. The Environmental Capital Network and the Investors Circle co-sponsored these events. In addition, the Chelsea Center for Recycling and Economic Development worked with the Northeast Recycling Council to present the Recycling Finance Seminar for Massachusetts's bank loan officers; state and local economic developers; and public, private, and nonprofit business development service providers.

STEP: IN ACTION IN 2000

EASING THE BURDENS OF DOING BUSINESS

The following Massachusetts companies received assistance through STEP's capital raising activities:

- **CASTion**, a manufacturer of water treatment systems (Ludlow)
- **ElectroChem, Inc.**, a developer of small fuel cell power systems (Woburn)
- **Analine.com, Inc.**, an Internet-based reverse auction exchange for the environmental services and products industry (Cambridge)
- **Adrenaline Research, Inc.**, a developer of a plasma spark that boosts engine fuel economy while lowering emissions (Hudson)
- **SelecTech, Inc.**, a manufacturer that converts plastic scrap into new products (Tauton)
- **EnergyGuide.com**, an Internet company which connects energy consumers with deregulated sources of power (Newton)
- **Ion Signature Technology**, a developer of software that reduces the time and cost of conducting chemical analysis (Cambridge)
- **Water Recovery Systems**, a developer of water treatment systems (Middleboro)
- **Stirling Advantage Inc.**, a developer of engines that convert heat to electricity efficiently (Athol)
- **AptusNet**, a developer of web-based materials trading networks (Bloomfield)
- **Aspen Systems, Inc.**, a developer of aerogels for high thermal insulation, infrared shielding, and acoustic and shock absorption (Marlborough)
- **Combustion Electromagnetics Inc.**, a pioneer of "lean burn" engine and spark ignition systems (Arlington)
- **Organic Commodity Products**, a developer of sustainably grown organic cocoa in Latin America (Cambridge)
- **TerraTherm**, a provider of a rapid and thorough method for in-situ remediation of soils impacted with a wide range of volatile and semi-volatile contaminants (Fitchburg)



STEP: IN ACTION IN 2000

EASING THE BURDENS OF DOING BUSINESS

Building a Network of Recycled Product Manufacturers

To support manufacturers who use recycled feedstocks in their products, the Chelsea Center for Recycling and Economic Development (CCFRED) launched the Network of Recycled Product Manufacturers last year.

Based on initial meetings and surveys, interest in the network is high. The network will help manufacturers with information sharing, training, and joint problem solving on marketing, regulatory, and business issues. Manufacturers will drive the structure and agenda of the network, with the CCFRED providing staff support.

Moving Massachusetts Innovation across State Lines

The Executive Office of Environmental Affairs (EOEA) is making it easier for Commonwealth companies to transfer their environmental technologies to other states. As a leader in the environmental technology reciprocity partnership with the environmental agencies in New Jersey, Pennsylvania, Virginia, California, Illinois, and New York, DEP has helped develop common protocols for stormwater technologies and beneficial use determinations. These protocols allow state agencies to share technology verifications and permit approvals, expediting paperwork for STEP companies that follow the interstate protocols. EOEA is working with the environmental technology reciprocity partnership on additional protocols for pollution prevention technologies and energy efficiency and renewable energy technologies and strategies.

Working Together to Prepare for the Future

The National Environmental Technology Institute (NETI) and the Center for Energy Efficiency and Renewable Energy (CEERE) worked together with other northeastern states to identify industries to participate in the U.S. Department of Energy, Office of Industrial Technology program called Industries of the Future (IOF). The program will assist industries in developing technologies to improve their energy and raw material use and reduce pollution and waste, while maintaining efficient production. Leaders from the region's chemical and plastics, printing, pulp and paper, metal casting, instruments, and information and communications industries were identified for the program. STEP has obtained follow-up funding from the Department of Energy to launch a Massachusetts IOF program. Industry leaders will use the program to produce their own roadmap to the future, allowing them to gain access to state and federal funding and to participate in policy initiatives.

STEP

For more information about any of the projects described in this report, please feel free to contact the appropriate organization listed below.

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COMPANIES RECEIVING STEP ASSISTANCE DURING 2000-2001

3M Worldwide (Minnesota)

Adrenaline Research, Inc. (Hudson)

Advanced Recovery Technologies (Peabody)

Aerodyne Research (Billerica)

Alza (California)

American Reclamation Corp. (Charleton City)

Analine.com, Inc. (Cambridge)

Applied Recovery Technology (Beverly)

AptusNet (Marblehead)

Aquafuture, Inc. (Turners Falls)

Aspen Systems, Inc. (Marlborough)

Asphalt Reclamation Industries (Fitchburg)

Atlantic Rim Technologies (Quincy)

AWT Environmental, Inc. (New Bedford)

Bay State Paper Company (Hyde Park)

Benthos (N. Falmouth)

Bio-Dynamics LLC (West Concord)

Biofine (Waltham)

BioTell, Inc. (Salem)

Bison 500, LLC (Worcester)

BP/Amoco (Illinois)

BTU International (North Billerica)

Built-e, Inc. (Washington)

CASTion (Ludlow)

Cellutech, Inc. (Ashland)

CeraMem (Waltham)

Charlotte Stuff (Somerville)

Claremont Flock Corp. (Leominster)

Clean Diesel (Northampton)

Clean Start Properties (Pawtucket)

Combustion Electromagnetics Inc. (Arlington)

Conigliaro Industries (Framingham)

Covalent Associates, Inc., (Woburn)

Creative Packaging & Paper Inc. (Worcester)

Crispina Designs, Inc. (Housatonic)

Crystal Water Systems (Chestnut Hill)

CSR Hydro Conduit/Stormceptor (Missouri)

Daicel (Japan)

Decopier Technologies, Inc. (Lawrence)

Dow Chemical (Texas)

E Paint (East Falmouth)

East Coast Trading, Inc. (Leominster)

Eastman Kodak (New York)

Electric Vehicle World Wide (Norfolk)

ElectroChem (Woburn)

ELM Environmental (Holbrook)

EnergyGuide.com (Wellesley Hills)

Engelhard (New Jersey)

Environmental Printing Alternatives (Worcester)

Environmental Research Corp. (Freetown)

Environmental Solar Systems (Methuen)

Fleet Development Corporation (Boston)

Foster Miller (Waltham)

GE Plastics (Pittsfield)

GEI Consultants, Inc. (Winchester)

General Electric (New Jersey)

GM Refrigeration of Fall River (Fall River)

Guardian Environmental Technologies Inc.
(Connecticut)

Harodite (Taunton)

HIL Technology, Inc. (Maine)

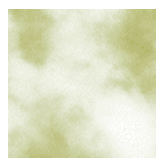
ICET (Norwood)

Ion Signature Technology (Cambridge)

J.P. Routhier, Inc. (Littleton)

Kennedy Die Castings, Inc. (Worcester)

KSE, Inc. (Amherst)



COMPANIES RECEIVING STEP ASSISTANCE DURING 2000-2001

Lasertone Corporation (Wayland)
Little Brook Manufacturing (Springfield)
Loctite (Connecticut)
LRV Inc. dba Clean Air Technologies (Natick)

Markem (New Hampshire)
Microbial Systems (Waltham)
Midac Corp. (Norwood)
Millipore (Bedford)
Mitsubishi Chemical (Japan)
Morton International (Dedham)
Multicore Solders (Texas)

New England Aquaculture (Dighton)
New England Plastics Corporation (Taunton)
New England Recycling (Taunton)
Niman Ranch (California)

Organic Commodity Products (Cambridge)

PDZ Europa Scientific (Ohio)
Phoenix Science and Technology, Inc. (Lexington)
Physical Sciences Inc. (Andover)
Polaroid Corporation (Cambridge)
Presstek (New Hampshire)
Pure Cycle Environmental Technologies, Inc. (Palmer)

Radiation Monitoring Devices (Watertown)
Raytheon Corp. (Lexington)
Recycle Away Group Svs., Inc. (Taunton)
Recycline, Inc. (Somerville)
Red Sun Press (Jamaica Plain)
Remedial Solutions, Inc. (Tennessee)
Rexam Graphics (Holyoke)
Rochester Environmental Park (Rochester)
RYPOS, Inc. (Medway)

Sam Cohen Company (Brockton)
Sanmina (formerly Hadco) **Corporation** (Haverhill)
SeaTech (Satkin Industries, Inc.) (New Bedford)
SelecTech (Taunton)
Sheltech Plastics, Inc. (Methuen)
Sippican (Marion)
Solectron Corporation (Westborough)
SolmeteX (Billerica)
Solutia (Indian Orchard)
Specialty Chemical Company (Wisconsin)
Stephens Associates (Tewksbury)
Stirling Advantage Inc. (Athol)
StormTreat (Sandwich)
Super Cool Corporation (Arlington)
Supply Solutions (Winchester)

TerraTherm (Fitchburg)
Texas Instruments (Attleboro)
Thermo Fibergen (Bedford)
TKM Materials, LLC (New York)
Trigen Ewing (Turners Falls)
Trio Algarvio, Inc. (New Bedford)

Unwrapped, Inc. (Lowell)

Vortechnics, Inc. (Maine)

Walden Products, Inc. (Concord)
Wastenot Consulting Services (Holyoke)
Water Recovery Systems (Middleboro)
Western Bronze, Inc. (W. Springfield)

Zero Discharge Technologies, Inc. (Chicopee)



Acronyms for STEP Partners

ATMC	<i>Advanced Technology & Manufacturing Center (UMass Dartmouth)</i>
EBTC	<i>Environmental Business and Technology Center (UMass Boston)</i>
CEAM	<i>Center for Environmentally Appropriate Materials (UMass Lowell)</i>
CEERE	<i>Center for Energy Efficiency and Renewable Energy (UMass Amherst)</i>
CCFRED	<i>Chelsea Center for Recycling and Economic Development (UMass Lowell)</i>
EOEA	<i>Executive Office of Environmental Affairs</i>
DEP	<i>Department of Environmental Protection</i>
OTA	<i>Office of Technical Assistance for Toxics Use Reduction</i>
NETI	<i>National Environmental Technology Institute (UMass Amherst)</i>
TURI	<i>Toxics Use Reduction Institute (UMass Lowell)</i>
UMass	<i>University of Massachusetts</i>



Massachusetts Strategic
Envirotechnology Partnership

